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# PATENT SPECIFICATION

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## (54) IMPROVEMENTS RELATING TO PACKS AND METHODS OF MAKING THEM

(71) We, METAL BOX LIMITED, of Queens House, Forbury Road, Reading, RG1 3JH (formerly The Metal Box Company Limited, of 37, Baker Street, London, W1A 1AN), a British company, do hereby declare the invention for which we pray that a patent may be granted to us and the method by which it is to be performed to be particularly described in and by the following statement:—

This invention relates to packs comprising goods enclosed in a flexible wrapper closed at the bottom and having handle-forming means to enable the pack to be carried in one hand; and to methods of making such packs.

According to the invention in a first aspect thereof, a pack comprises goods enclosed in a flexible wrapper closed at the bottom and having two opposed main panels joined together at each side by a side panel having a single longitudinal gusset, each said gusset having a longitudinal fold line and lying between at least upper side regions of the main panels, each gusset being further joined to the main panels by a transverse top seam at or adjacent the top of the wrapper, the wrapper having handle-forming means in two zones, each said zone being defined by a said upper side region of one main panel and the corresponding upper side region of the other main panel, said main panels and at least the fold lines of the gussets being joined together at the lower end of said zones in at least one transverse seam element, said element or elements defining at least partly the bottom end of said zones, said zones including the corresponding gusset intermediate between the top of the goods and the said top seam, said handle-forming means being formed at least in the material of the gusset in each of said zones.

In a first form of pack according to the invention, the handle-forming means comprises an opening formed through the gusset in each said zone. Preferably each said opening is a longitudinal slit along the corresponding said fold line.

In a second form of pack according to the invention the handle-forming means are defined by a longitudinal weakening line, formed in each said upper side region of the main panels and in the gussets between them and extending to the top edge of the wrapper, so that when said weakening lines are ruptured the main wall and gusset material in each said zone forms a looped carrying handle. The longitudinal weakening lines may be joined by transverse weakening lines at their bottom ends to define a tear-out portion above the top of the goods.

The pack may have a further transverse seam constituting a single said seam element and extending the full width of the pack. Alternatively, two said seam elements may for example be placed so as to "stop" the bottom end of the slit in the gusset or of the longitudinal weakening lines, to prevent the slit or weakening lines from being extended downwards by tearing when the pack is carried. Thus the transverse seam elements may in effect constitute a continuous or intermittent transverse seam; in the case where this consists of a continuous weld seam extending the full width of the wrapper, the goods are sealed within the latter.

The invention thus provides a pack in which goods are pre-packed for sale or transport but which may be carried by a handle, formed either by the slits in the gusset (in the first form mentioned above), in which a person's finger may be engaged so that the wrapper material between the slits is bunched in the handle; or by the residual loops formed by tearing the longitudinal weakening lines and (if the above-mentioned transverse weakening lines are provided) by removing the tear-out portion. In each case the handle is formed by rupturing the gussets at or adjacent the folds thereof in the upper part of the wrapper above the goods, either before or after the pack has been made.

The wrapper may be of material having what are sometimes called gauge bands,

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that is to say the wrapper has at least one integral band, extending the whole length of the wrapper, in which band or bands the wrapper material is thicker than the remainder of the wrapper material. 5

The wrapper, with or without gauge bands, is preferably formed from lay-flat gussetted tube, that is to say flexible tubular material preferably though not necessarily seamless, having two opposed inwardly-folded continuous gussets whereby the material can be laid flat. Alternatively the material may be initially in the form of sheet, either of a size suitable to form an individual wrapper or in a long web from which the wrapper is cut. 10

The wrapper material may comprise plastics film material, either in a single thickness or in a laminated form. In the latter case one or more plies may be of material other than plastics, for example metal foil or paper. Alternatively, the wrapper material may be any other suitable flexible material, for example paper or laminated paper. 15

Where the material is plastics film the top seam and the or each said seam element has preferably been formed by welding. In the case where paper is used, stitching may for example be used in place of welding. 20

In the first form of pack mentioned hereinbefore, where the wrapper material is plastics film having gauge bands, each of the said gussets preferably includes a said band so that each of said openings is formed through the thicker material of a corresponding said band. 25

In the second form of pack mentioned hereinbefore, where the wrapper material is plastics film having gauge bands extending along at least the main panels, the longitudinal weakening lines in the main panels are preferably formed in the gauge bands of the main panels. 30

Plastics film is a preferred material for the wrapper in any pack according to the invention, the said top seam and the or each said seam element preferably being formed by welding. 45

According to the invention in a second aspect thereof, a method of making a pack includes the steps of loading goods into an open top end of a wrapper of flexible material having two opposed main panels joined together transversely to close the wrapper and support the goods below said top end, and also joined together at each side by a side panel in which a single longitudinal gusset has a longitudinal fold line and lies between at least upper side regions of the main panels, the main panels being spaced apart to receive the goods between them, the goods being loaded so as not to fill the wrapper; closing the open top end above the goods so as to fold each 50

gusset between an upper side region of one main panel and a corresponding upper side region of the other main panel at the respective side of the wrapper, so as to define a zone including said upper side regions and the gusset between them; forming a transverse top seam across the material so closed; forming at least one transverse seam element joining the main panels and at least the fold lines of the gussets together at the bottom end of each said zone; and forming in each of said zones handle-forming means at least in the material of the gusset. 55

In the manufacture of a pack of the first form above-mentioned, the handle-forming means are formed by slitting along the fold line of each gusset within the corresponding one of the said zones. 60

In the manufacture of a pack of the second form above-mentioned, the handle-forming means are formed by simultaneously making a longitudinal weakening line in each of said upper side regions of the main panels and in the gussets between them such that the weakening lines extend to the top edge of the wrapper. 65

Various embodiments of the invention will now be described, by way of example only and with reference to the accompanying drawings, of which:—

Figure 1 is an end elevation of a pack according to the invention in a first form; 70

Figure 2 is a side elevation of the same pack; 75

Figure 3 is an inverted sectional plan taken on the line III—III in Figure 2; 80

Figure 4 is a view corresponding to part of Figure 2 but showing a modification; 85

Figure 5 is a transverse section through a layflat seamless gussetted tube in one form suitable for use in the manufacture of packs according to the invention; 90

Figure 6 is an end view of a pack generally similar to that of Figure 1 but having a wrapper made from the tube shown in Figure 5; 95

Figure 7 is a view similar to Figure 5 taken on the line VII—VII in Figure 8 and showing a wrapper of a pack incorporating seamless gussetted tube in another form; 100

Figure 8 is a side view of the pack shown in Figure 7; 105

Figure 9 is a side elevation of a further form of pack according to the invention; 110

Figure 10 is a perspective view of the top part of the pack shown in Figure 9, with a tear-out panel of the latter removed to form carrying handles; 115

Figures 11, 12 and 13 are sectional views, taken respectively on the lines XI—XI in Figure 14, XII—XII in Figure 15, and XIII—XIII in Figure 16, showing three respective modified forms of wrapper of 120

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5 packs generally similar to that shown in Figure 9;

5 Figure 14, 15 and 16 are scrap side elevations each showing a top corner portion of the respective packs of Figures 11 to 13;

10 Figure 17 is a scrap side elevation showing a modified seam suitable for use in packs according to the invention;

10 Figures 18 to 23 are diagrammatic elevations illustrating various stages in one method for the manufacture of packs according to the invention, Figures 18, 19 and 23 being cross-sectional views and Figures 20 to 22 outside views; Figure 23 being a view, as seen in the direction of the arrow XXIII in Figure 19; and Figures 18 to 22 being viewed end-on to the pack;

15 Figure 24 is an end elevation, to a larger scale, of a pair of gripping, cutting and welding jaws for use in a method such as is illustrated in Figures 18 to 23; and

20 Figure 25 is a front elevation of part of a jaw taken on the line XXV—XXV in Figure 24.

25 The pack shown in Figures 1 to 3 comprises goods 10 enclosed in a flexible wrapper 11 closed at the bottom by a transverse bottom seam 12, and having two opposed main, or front and back, panels 13 which are joined together at each side by a respective one of two side panels 14. Each of the side panels 14 has a single gusset 15 which extends along the side panel, i.e. 30 longitudinally of the bag.

35 Upper side regions of the main panels 13 are indicated at 13' in Figure 2. As shown at 16, the goods 10 cause the side panels 14 to bulge out, but even so part of each gusset 15 lies intermediate between the upper side regions 13' of the front and back panels 13 as indicated at 15'. Each gusset is defined by the two inwardly-directed portions 14' of the side panel which meet at the gusset fold line 17.

40 At or adjacent the top of the wrapper, a transverse upper seam 18 joins the gussets 15 and the main panels 13 (in the regions 13' thereof) together so as to close the top of the pack.

45 In the zone 19 at each side of the bag, defined by the corresponding pair of upper side regions 13' of the main panels so as to include these regions and the corresponding gusset portion 15' intermediate between the top of the goods 10 and the upper seam 18, a slit 20 is formed along the gusset fold 17 to define handle-forming means, whereby the pack can be carried by inserting a thumb through one slit 20 and the fingers of the same hand through the other slit, the central top portion 21 of the wrapper being bunched in the hand.

50 The main panels 13 are joined to each

5 other and to at least the gusset folds 17, at or immediately below the lower ends of the slits 20 by a further, intermediate transverse seam 22. In the embodiment shown in Figure 2, this seam extends the full width of the wrapper so as to join not only the fold, but also the gusset portions 14' to the main panels. In the embodiment shown in Figure 4, this further transverse seam 22 consists merely of two short portions 22' overlapping the gusset fold 17 so as to pinch the material of the gussets and of the main panels 13 together at the bottom ends of the slits 20. The intermediate seam 22 serves to strengthen the material at or just below the bottom ends of the slits 20 so as to prevent substantial downward tearing of the slits.

70 The wrapper material is preferably plastics film, and in the embodiments shown in the drawings the seams 12, 18, 22 are all formed by welding the various layers of film together.

75 In Figures 1 to 4 the wrapper is made from extruded lay-flat seamless gussetted tube of uniform thickness. The wrappers may however be of similar tube but of the kind having at least one integral "gauge band" extending continuously longitudinally of the tube and therefore the whole length of the wrapper; these bands comprise material thicker than the remainder of the wrapper. In the embodiment shown in Figures 5 and 6, there are two gauge bands 30, one in each side panel 13 so as to be included in the gussets, the slits 20 being formed in the bands 30. This not only strengthens the handles defined by the slits, but also strengthens the side panels 14.

80 In the embodiment shown in Figures 7 and 8, there are two gauge bands 31 in each main panel 13, so disposed as to overlap the line of the slits 20 as shown in Figure 8.

85 Turning now to Figures 9 and 10 of the drawings, the pack shown therein again comprises goods 10 in a wrapper 11 having the top intermediate and bottom weld seams 12, 18, 22 respectively; but the slits 20 are absent. Instead, the handle-forming means in the zones 19 comprises longitudinal weakening lines 40 (Figure 9) formed in the upper side regions 13' of the main panels and in the gusset portions 14' between them. The weakening lines 40 extend to the top edge of the wrapper, so that when they are torn downwards to displace the material 21 outside them, the material of the main walls 13 and of the gusset portions 14' in the zones 19 remains in the form of looped carrying handles 41. In particular, it will be observed that since the weakening lines 40 are formed in the zones between the folds 17 of the gussets and the side edges of the wrapper itself, a narrow portion 42 of each gusset is

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removed when the lines 40 are ruptured, so creating an opening 43 in each gusset.

In this example the weakening lines 40 are joined by transverse weakening lines 44 above the top of the goods, being shown just above the intermediate seam 22, though it may be just below the seam 22. The centre top portion 21 thus becomes a tear-out portion which, with the narrow strips 42 aforementioned, can be removed completely before emptying the wrapper, although for the purpose of picking up the pack by the handle loops 41, in order to carry it, say, from a shop to one's home, one would normally tear it along the weakening lines 40 only, thus leaving the portion 21 attached along the seam 22.

Gauge bands may be provided in packs of the kind typified by Figures 9 and 10. They may for example be positioned as already described with reference to Figures 7 and 8, the longitudinal tear lines 40 in the main panels being formed in the bands 31. Figures 11 to 16 show further possibilities.

In Figures 11 and 14, the width of each of the four gauge bands 50 shown extends from very close to the side edge of the appropriate main panel 13 to a line just inboard of the gusset fold 17. In Figures 12 and 15, there are two gauge bands 51, each extending between two lines on the front and rear panels respectively just inboard of the gusset fold 17 and including the whole of the side panels 14. In Figures 13 and 16, there are again two gauge bands 52, each occupying the whole of the respective main panel 13 except for a strip 53 of the latter intersecting the upper side region 13'.

Other arrangements of integral gauge bands may be adapted as convenient.

Referring now to Figure 17, it will be realised that the intermediate seam 22, in either of the arrangements typified by Figures 1 to 3 or Figures 9 and 10, may be of the continuous form shown in Figure 9, or for example the form shown in Figure 4. Figure 17 shows another form of intermediate seam consisting of an intermittent weld seam.

Goods of any suitable kind may be packed in packs of the kinds described above. These packs are suitable for making up in a factory so that the pre-packed goods can be despatched for sale in the packs which the ultimate customer can easily carry by means of the handles. The packs are sealed on being made, in the case of the embodiment shown in Figure 9; and where the transverse intermediate seam 22 is continuous, the packs are also sealed in the case of those shown in Figure 1, and in most embodiments remain sealed until finally opened by the ultimate consumer. It will be seen that the packs are particularly suited for relatively heavy amounts of loose goods,

such as fertilizers, grass seed or dry pet food, for example. With the use of suitably strong and impervious materials for the wrapper and the provision of leak-tight weld seams, liquids may be packed in the packs. Another possible use might be for wrapping customers' goods at supermarket checkouts, using equipment of known kinds.

A method of making packs according to the invention, for pre-packing goods in a factory, will now be described with reference to Figures 18 to 25.

Referring to Figure 18, lay-flat seamless gussetted tube 60 of plastics material is drawn in flat condition from a reel, not shown, between a pair of lower grippers 61 each having a heatable weld bar (not shown) for making the bottom seam 12, Figures 2 and 9. Above the lower grippers 61 there is a pair of upper grippers 62, which may typically be as seen in Figures 24 and 25.

As shown therein, each upper gripper 62 consists of a gripper bar 63 at least as wide as the main panels of the tube (i.e. the main panels 13, Figure 2), and having suction orifices 64 connected to a source of vacuum (not shown) so to grip the adjacent material of the lay-flat tube 60. Each gripper bar 63 also includes upper and lower electrically-heated weld bars 65, 66 respectively for forming respectively the upper and intermediate weld seams 18, 22, Figure 2 or Figure 9. One of the gripper bars 63 carries a guillotine 67 for severing a completed wrapper from the tube 60, the guillotine 67 being operated by any suitable means not shown.

The upper grippers 62 are movable horizontally apart and together and are also movable vertically between the levels indicated in full and broken lines in Figure 22. The lower grippers 61 are movable horizontally apart and together.

In operation, therefore, the upper grippers 62, are separated in the position and at the level shown in Figure 18, to grip an end portion 60' of the seamless tube 60, so that the latter is opened out as shown above the lower grippers 61, so defining the wrapper 11 closed at the bottom by the lower grippers 61 and having the two opposed main panels 13 and the side panels 14 as already described. As opened out, the side panels 14 are substantially flat but the gusset folds 17 are of course present.

Goods 10 are loaded into the wrapper material 11 through the open top end thereof, Figure 18, so as not to fill the wrapper material. At this stage, if slits 20 (Figure 1) are to be provided, they are formed in the appropriate positions in the side panels 14, Figure 19, by suitable means such as the rotating knives 68 shown in Figure 23. The knives 68 are arranged to be

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moved towards each other to form the slits 20, and then to be retracted clear of the wrapper material 60.

5 The upper grippers 62 are now closed together as shown in Figure 20, so closing the top end portion 60' of the wrapper above the goods 10 in such a way as to fold each gusset in the said top end portion 60' between the upper side regions 13', Figure 10 2 or Figure 9, of the corresponding pair of such regions.

If the wrapper is to be of the kind, for example as shown in Figure 9, having lines of weakening to define the handle-forming means thereof, these lines of weakening are formed, as the upper grippers 62 come together with the top end portion 60' of the wrapper between them, by suitable projections 69, Figure 25, on the gripper bars 63 defining the longitudinal weakening lines 40 and, if provided, the transverse weakening lines 44.

15 At the same time the weld bars in the lower grippers 61 are energised to form the bottom seam 12, the lower grippers 61 then being moved apart (Figure 21), out of engagement with the plastics tube 60.

20 The weld bars 65, 66 in the upper grippers are also energised simultaneously to form the upper seam 18 and intermediate seam 22 respectively.

25 The upper grippers 62 are subsequently raised to their upper position as shown in Figure 21, at the same time raising the filled wrapper material 11 and drawing up a fresh length of flexible tube 60 between the lower grippers 61.

30 The pack 70 so formed is now supported by suitable means such as a pair of co-operating pusher members 71, Figure 23, which move towards each other to engage the sides of the pack and hold it upright.

35 The upper grippers 62 can now be moved apart horizontally, lowered to their original level and brought together again, as indicated in Figure 22, to grip the top of the fresh length of flexible tube 60, the vacuum being energised at the same time. The guillotine 67 is then operated to separate the pack 70 from the flexible tube 60 below it.

40 The finished pack 70 can then be removed by the pushers 71 or by other suitable means. The lower grippers 61 once more move together and the upper grippers 62 move apart to reproduce the condition shown in Figure 18 ready for filling of a further section of the wrapping material.

45 It will be understood that the above is only one example of possible ways of performing the method according to the invention of making packs such as those described herein.

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WHAT WE CLAIM IS:—

1. A pack comprising goods enclosed in a flexible wrapper closed at the bottom and having two opposed main panels joined together at each side by a side panel having a single longitudinal gusset, each said gusset having a longitudinal fold line and lying intermediate between at least upper side regions of the main panels, each gusset being further joined to the main panels by a transverse top seam at or adjacent the top of the wrapper, the wrapper having handle-forming means in two zones, each said zone being defined by a said upper side region of one main panel and the corresponding upper side region of the other main panel, said main panels and at least the fold lines of the gussets being joined together at the lower end of said zones in at least one transverse seam element, said element or elements defining at least partly the bottom end of said zones, said zones including the corresponding gusset intermediate between the top of the goods and the said top seam, said handle-forming means being formed at least in the material of the gusset in each of the said zones. 65
2. A pack according to Claim 1, wherein the handle-forming means comprises an opening formed through the gusset in each said zone. 70
3. A pack according to Claim 2, wherein each said opening is a longitudinal slit along the corresponding said fold line. 75
4. A pack according to Claim 1, wherein the handle-forming means are defined by a longitudinal weakening line, formed in each said upper side region of the main panels and in the gussets between them and extending to the top edge of the wrapper, so that when said weakening lines are ruptured the main wall and gusset material in each said zone form a looped carrying handle. 80
5. A pack according to Claim 4, wherein the longitudinal weakening lines are joined by transverse weakening lines at their bottom ends to define a tear-out portion above the top of the goods. 85
6. A pack according to any one of the preceding claims, having a further transverse seam constituting a single said seam element and extending the full width of the pack. 90
7. A pack according to any one of the preceding claims, wherein the wrapper is of plastics film material having at least one integral band, extending the whole length of the wrapper, in which band or bands the wrapper material is thicker than the remainder of the wrapper material. 95
8. A pack according to any one of the preceding claims, wherein the wrapper is of plastics film material having at least one integral band, extending the whole length of the wrapper, in which band or bands the wrapper material is thicker than the remainder of the wrapper material. 100

preceding claims, wherein the wrapper is formed from lay-flat gussetted flexible tube.

9. A pack according to Claims 2 and 7 in combination, wherein each of said gussets includes or is included in a said band so that each of said openings is formed through the thicker material of a corresponding said band.

10. A pack according to Claim 7 in combination with Claim 4 or Claim 5, wherein there are said bands extending along at least the main panels, the longitudinal weakening lines in the main panels being formed in said bands of the main panels.

11. A pack according to any one of the preceding claims, wherein the wrapper material comprises plastics film and the said top seam and the or each said seam element has been formed by welding.

12. A method of making a pack, including the steps of loading goods into an open top end of a wrapper of flexible material having two opposed main panels joined together transversely to close the wrapper and support the goods below said top end and also joined together at each side by a side panel in which a single longitudinal gusset has a longitudinal fold line and lies between at least upper side regions of the main panels, the main panels being spaced apart to receive the goods between them, the goods being loaded so as not to fill the wrapper; closing the open top end above the goods so as to fold each gusset between an upper side region of one main panel and a corresponding upper side region of the other main at the respective side of the wrapper, so as to define a zone including said upper side regions and the gusset between them; forming a transverse top seam across the material so closed; forming at least one transverse seam element joining the main panels and at least the fold lines of the gussets together at the bottom end of each said zone; and forming in each of said zones handle-forming means at least in the material of the gusset.

13. A method according to Claim 12, wherein said material is in the form of lay-flat gussetted tube.

14. A method according to Claim 12 or Claim 13, wherein the handle-forming means are formed by slitting along the fold line of each gusset within the corresponding one of said zones.

15. A method according to Claim 12 or

Claim 13, wherein the handle-forming means are formed by simultaneously making a longitudinal weakening line in each of said upper side regions of the main panels and in the gussets between them such that the weakening lines extend to the top edge of the wrapper.

16. A method according to Claim 15, wherein transverse weakening lines, joining the longitudinal weakening lines at their bottom ends to define a tear-out portion above the goods, are formed at the same time as the longitudinal weakening lines.

17. A method according to any one of Claims 12 to 16, wherein the wrapper material comprises plastics film said top seam and the or each said seam element being formed by welding adjacent surfaces of said film together.

18. A pack constructed and arranged substantially as hereinbefore described with reference to Figures 1 to 3 of the accompanying drawings.

19. A pack constructed and arranged substantially as hereinbefore described with reference to Figure 4 of the accompanying drawings.

20. A pack formed from lay-flat gussetted tube, wherein said pack is substantially as hereinbefore described with reference to Figure 5 of the accompanying drawings.

21. A pack formed from lay-flat gussetted tube, wherein said pack is substantially as hereinbefore described with reference to Figure 7 of the accompanying drawings.

22. A pack constructed and arranged substantially as hereinbefore described with reference to Figure 6 of the accompanying drawings.

23. A pack constructed and arranged substantially as hereinbefore described with reference to Figures 9 and 10 of the accompanying drawings.

24. A pack substantially as hereinbefore described with reference to Figures 11 to 16 of the accompanying drawings.

25. A pack according to any one of Claims 1 to 5, or 18 to 24, having an intermediate seam comprising a plurality of seam elements, substantially as hereinbefore described with reference to Figure 17 of the accompanying drawings.

26. A method of making a pack, according to any one of Claims 18 to 22 performed substantially as hereinbefore described with reference to Figures 18 to 25

of the accompanying drawings, the projections 69 in Figure 25 being absent.

27. A method of making a pack performed substantially as hereinbefore described with reference to Figures 18 to 22, 24 and 25 of the accompanying drawings.

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Sheet 1

FIG. 1

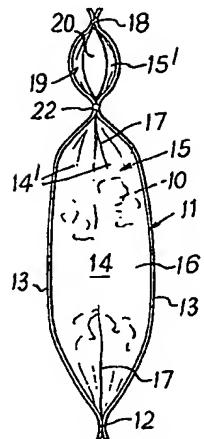


FIG. 2

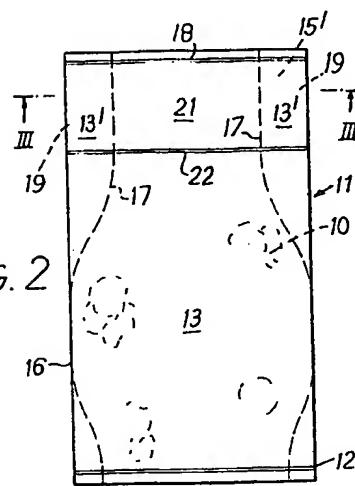


FIG. 3

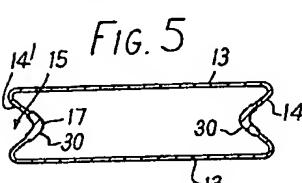
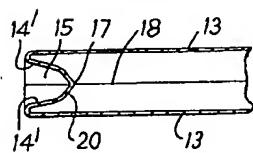


FIG. 7

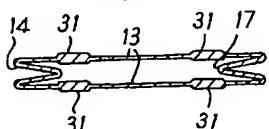


FIG. 4

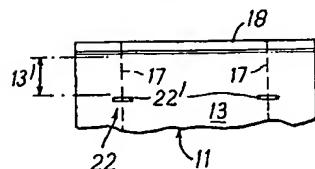


FIG. 8

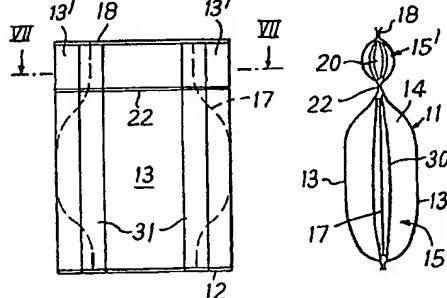


FIG. 6

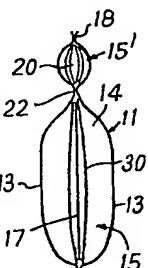


FIG. 9

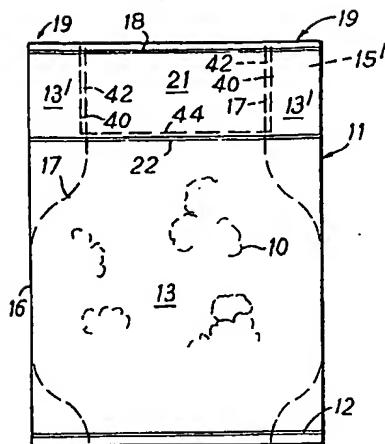


FIG. 10

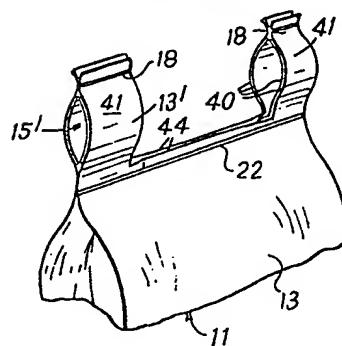


FIG. 11

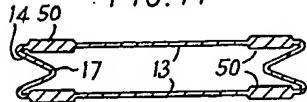


FIG. 12

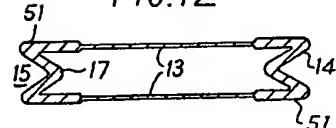


FIG. 13

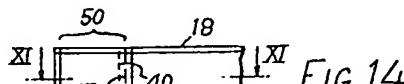
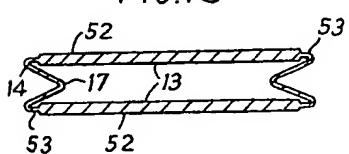


FIG. 14

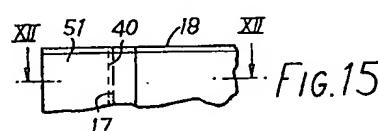


FIG. 15

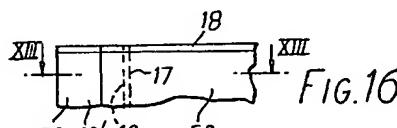


FIG. 16

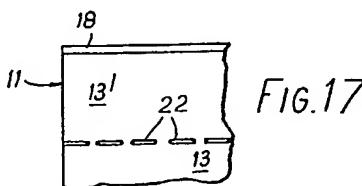


FIG. 17

1465695 COMPLETE SPECIFICATION  
 3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*  
 Sheet 3

FIG. 18

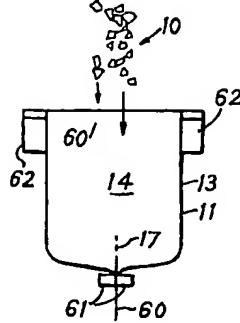


FIG. 19

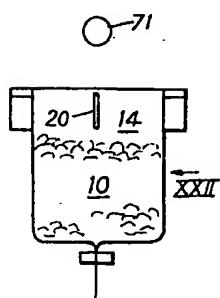


FIG. 20

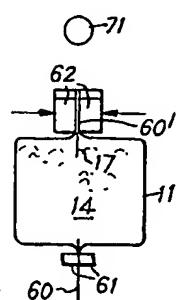


FIG. 21

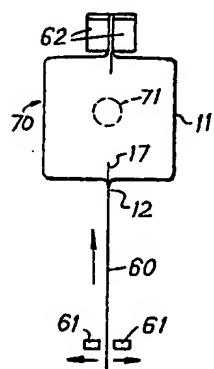


FIG. 22

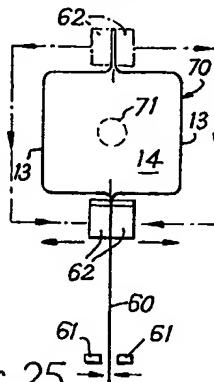


FIG. 25

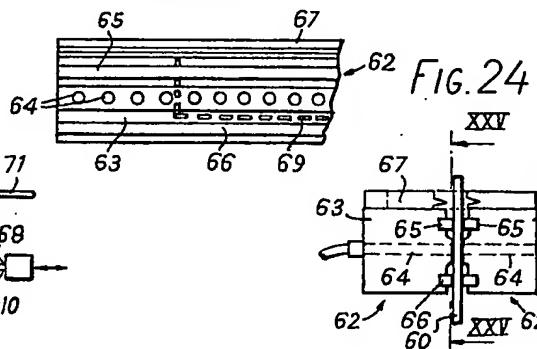


FIG. 23

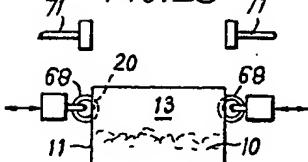


FIG. 24

